WHAT IS CLAIMED IS:

1. A method of desalting and concentrating a nucleic acid within a sample, said method comprising the steps of:

contacting the sample with a binding medium comprising a strongly hydrophobic base matrix; and

eluting the nucleic acid with an aqueous organic solvent.

2. The method of claim 1, wherein the binding medium is comprised of poly(styrene-divinylbenzene).

3. The method of claim 1, wherein the binding medium is a column comprised of particles having a diameter of about 1 micron to about 250 microns.

4. The method of claim 3, wherein the binding medium is a column comprised of particles having a diameter of about 50 to about 75 microns.

5. The method of claim 1, further comprising the step of:

rinsing the binding medium with an unbuffered aqueous solution prior to elution.

6. The method of claim 5, wherein the unbuffered aqueous solution is water.

7. The method of claim 5, wherein an effluent conductivity following rinsing is at or below 100 microSiemens/cm.

8. The method of claim 7, wherein the effluent conductivity following rinsing is at or below 25 microSiemens/cm.

9. The method of claim 1, wherein the nucleic acid has been modified with a compound selected from the group consisting of: biotin, fluorescein and related dyes, spacers, thiol modifiers, amino modifiers, carboxylate modifiers, or any combination of these.

10. The method of claim 1, wherein the nucleic acid is selected from the group consisting of: a DNA phosphodiester, RNA phosphodiester, phosphorothioate, methylphosphonate, 2'-O-methyl RNA, 2'-O-alkyl RNA, 2'-O-methyl DNA, 2'-O-alkyl DNA and chimeras containing such structures.

11. The method of claim 1, wherein the nucleic acid comprises nucleotide bases selected from the group consisting of: 5-methylcytidine, inosine, halogenated uridines, etheno-bases, dideoxynucleosides, and inverted bases.

12. The method of claim 1, wherein the nucleic acid is comprised of inverted 3'-5' linkages.

13. The method of claim 1, wherein the nucleic acid is comprised of 5'-2' linkages.

14. The method of claim 1, wherein the nucleic acid is an oligonucleotide comprised of about 1 to about 100 nucleotides.

15. The method of claim 1, wherein the sample is the product of strong anion exchange chromatography.

16. The method of claim 1 , wherein the sample is the product of weak anion exchange chromatography.

~~17. The method of claim 1 , wherein the sample is derived from a biological source material.~~

18. The method of claim 1, wherein the aqueous organic solvent is selected from the group consisting of acetonitrile, n-propanol, isopropanol, or methanol.

19. The method of claim 1 wherein the aqueous organic solvent is aqueous ethanol.

20. A method of exchanging a cation associated with a nucleic acid in a sample, comprising the steps of:

contacting a nucleic acid associated with a first cation with a binding medium comprising a strongly hydrophobic base matrix;

rinsing the nucleic acid bound to the binding medium with an unbuffered aqueous solution prior to elution;

contacting the bound nucleic acid with a solution comprised of a second cation; and

eluting the nucleic acid associated with the second cation from the binding medium; wherein the second cation effectively displaces the first cation in the effluent sample.